

LRO LEND PDS Data Viewer

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1)Overview

The LRO LEND PDS DataViewer is a software tool for browsing and displaying LRO Lend PDS data files in tabular or graphical format, and LRO LEND PDS label and format files in text format.

The tool reads LRO LEND PDS EDR and RDR files on your system. PDS files may be acquired through the PDS Geosciences Node. Data files are checked for correct byte length, and label and data files are checked to make certain there is one label file for each data file. Files that are non-matching or have incorrect byte length are flagged. A tree structure of the PDS files on your system is displayed. Files may be opened from this tree display which then updates up to 7 additional tabs which include

- 1) A Label File Display
- 2) A Format File Display which represents the format file for the chosen label or dat file
- 3) A Table Display of the data from the corresponding dat file
- 4) A Generate CSV Display tab
- 5) An RDR_RSCI graph tab which is activated if the dat file is a Rectified Science file allowing graphical representation of any of the eng/hskp or spectra channels. Data may be displayed in LRO or UTC time.
- 6) An RDR_DLD graph tab allowing graphical representation of any of the eng/hskp or spectra channels within a RDR_DLD dat file. Data may be displayed in LRO or UTC time.
- 7) An RDR_CHK graph tab allowing graphical representation of any of the channels within a RDR_CHK dat file. Data may be displayed in LEND or UTC time.
- 8) An RDR_ALF graph tab allowing graphical representation of any of the channels within a RDR_ALF dat file. Data is displayed in UTC time.
- 9) An RDR_ALD graph tab allowing graphical representation of any of the channels or spectra within a RDR_ALD dat file. Data is displayed in UTC time.

2) Obtaining LRO LEND PDS CDR / EDR files

Messenger GRS PDS EDR and CDR files may be obtained through the NASA PDS Geosciences Node at

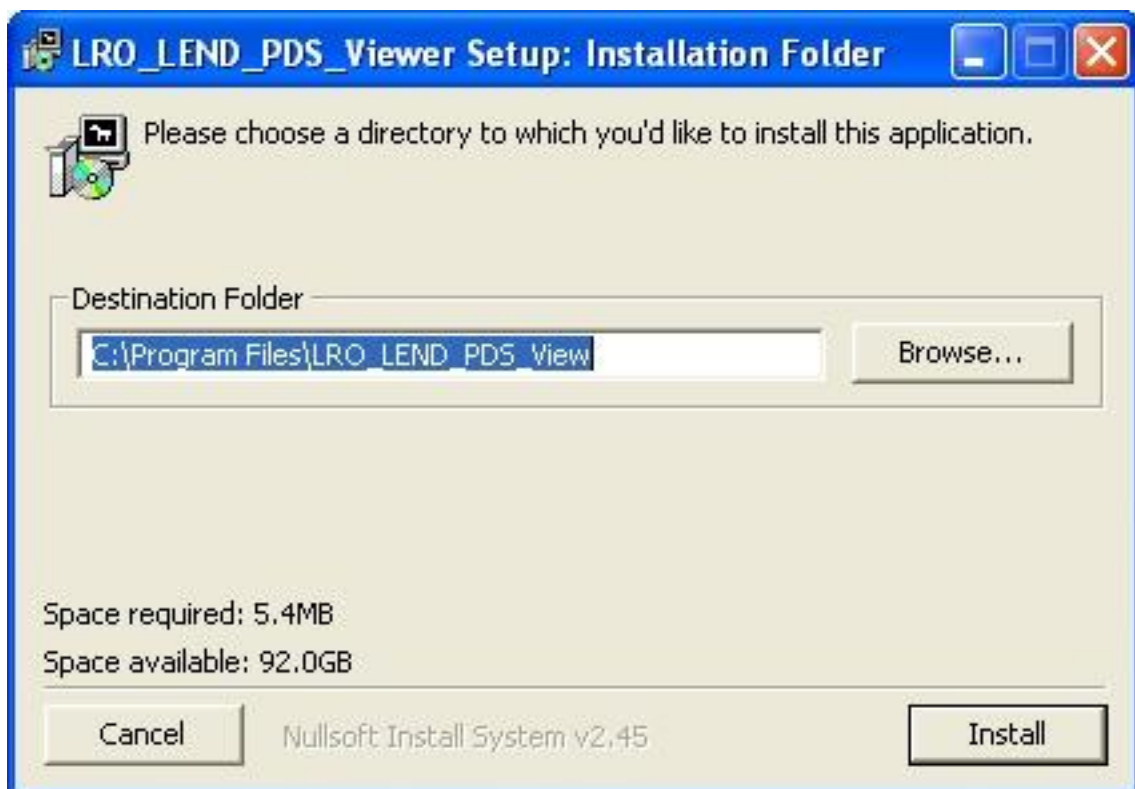
<http://geo.pds.nasa.gov/missions/lro/lend.htm>

At this location, the Lunar Orbital Data Explorer may be used to search and download data products.

The PDS files may be placed anywhere on your system. You will point the PDS Data Viewer to the location of your PDS files on startup / initialization. As with the NASA PDS data structure, the corresponding label (.lbl) and data (.dat) files must remain in the same folder.

3) Installation / Setup

Run (double click) the Setup_LRO_LEND_PDS.exe file. This will install the software on your system under a default folder at C:\Program Files\LRO_LEND_PDS_View or another location you may specify. A Start Menu Icon and an desktop Icon for launching will also be created at installation. Installation requires roughly 5.4 MB of disk space.



4) System Requirements

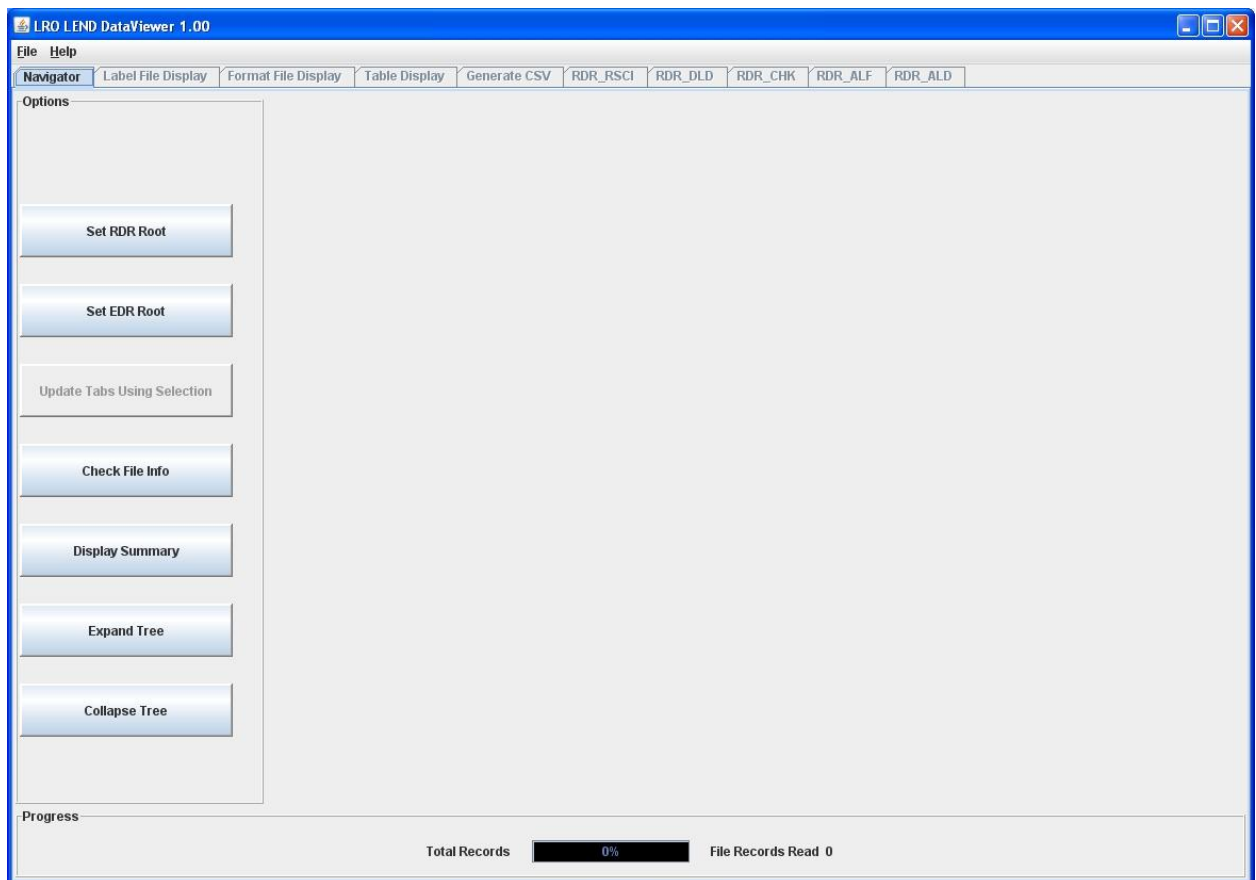
This software can be run from a Windows based system that has Java 1.6 or greater installed. You may download the Java Runtime environment for Windows free at

http://java.com/en/download/inc/windows_upgrade_xpi.jsp

If your system does not have Java installed, you must install Java prior to installing the MSGR GRS PDS Data Viewer software. Intel and 100% compatible processors are supported by Java. A Pentium 166MHz or faster processor with at least 64MB of physical RAM is recommended. You will also need a minimum of 98MB of free disk space to install Java.

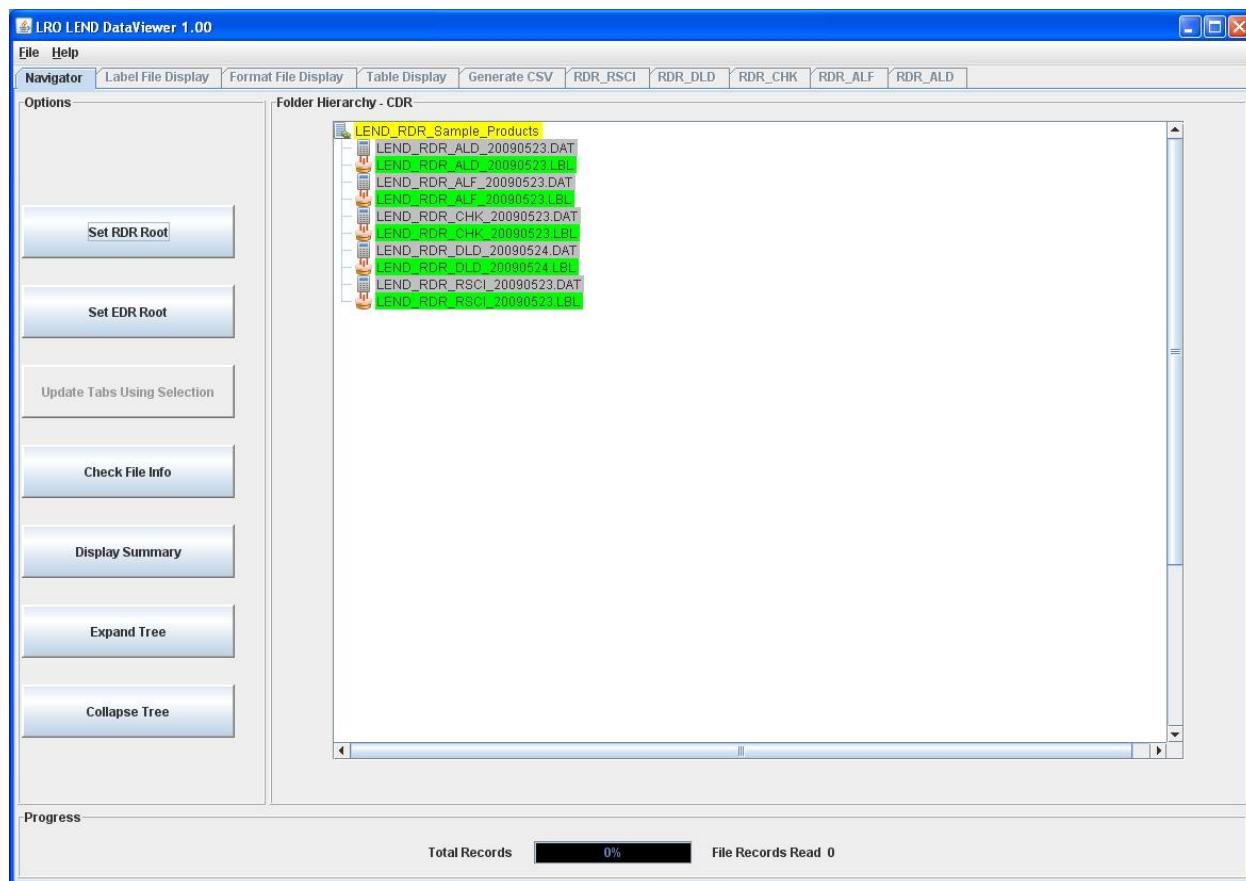
5) Main Navigator Screen Options

Upon launching the program from the Start Menu or your desktop Icon, the main navigator tab will open as follows:



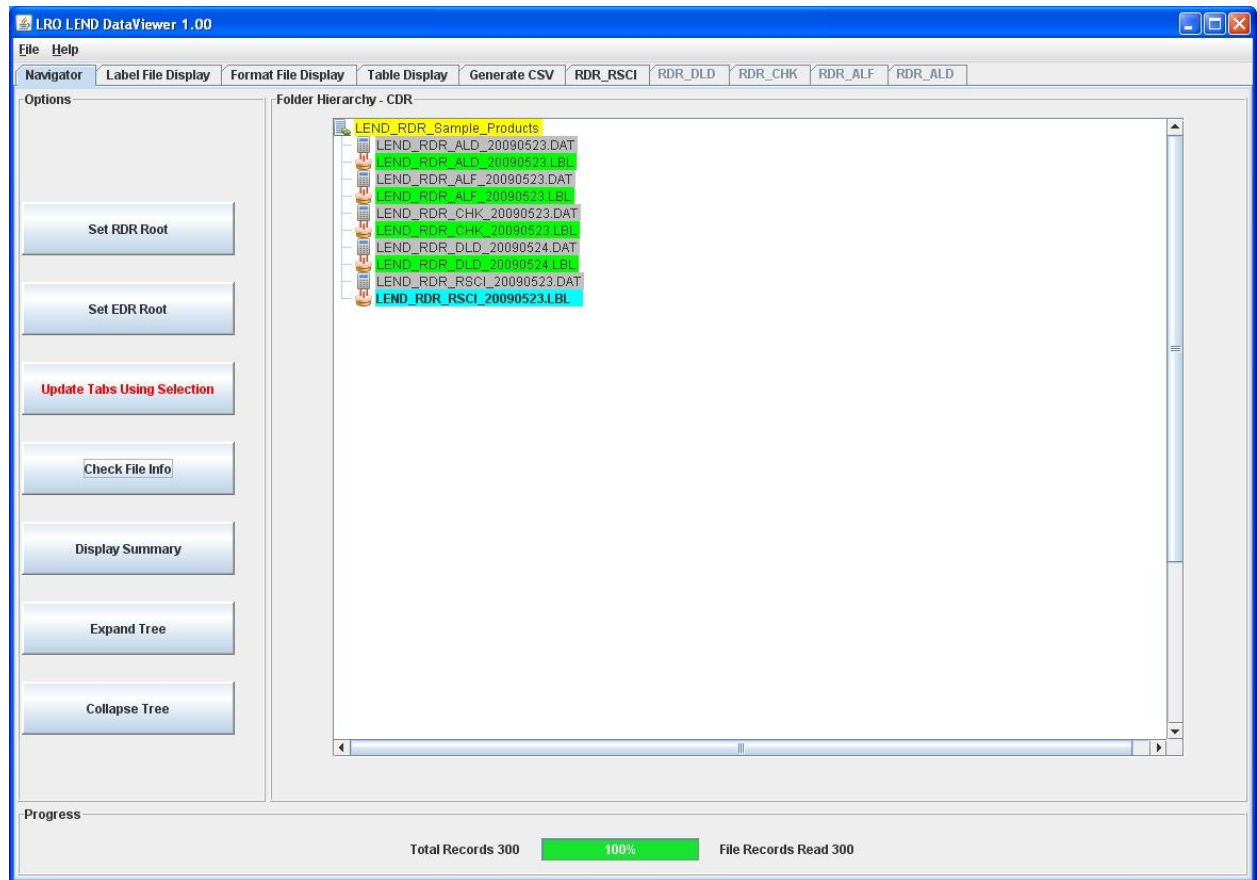
a) Opening and displaying an Archive

To begin, open an CDR archive by clicking on the “Set CDR Root button” Navigate to the top level folder that contains all of your CDR files and click on “Open” Your PDS files will be checked for correct byte length, and also that each dat file has a corresponding lbl file. A Tree structure will be displayed representing your PDS CDR files, as follows:

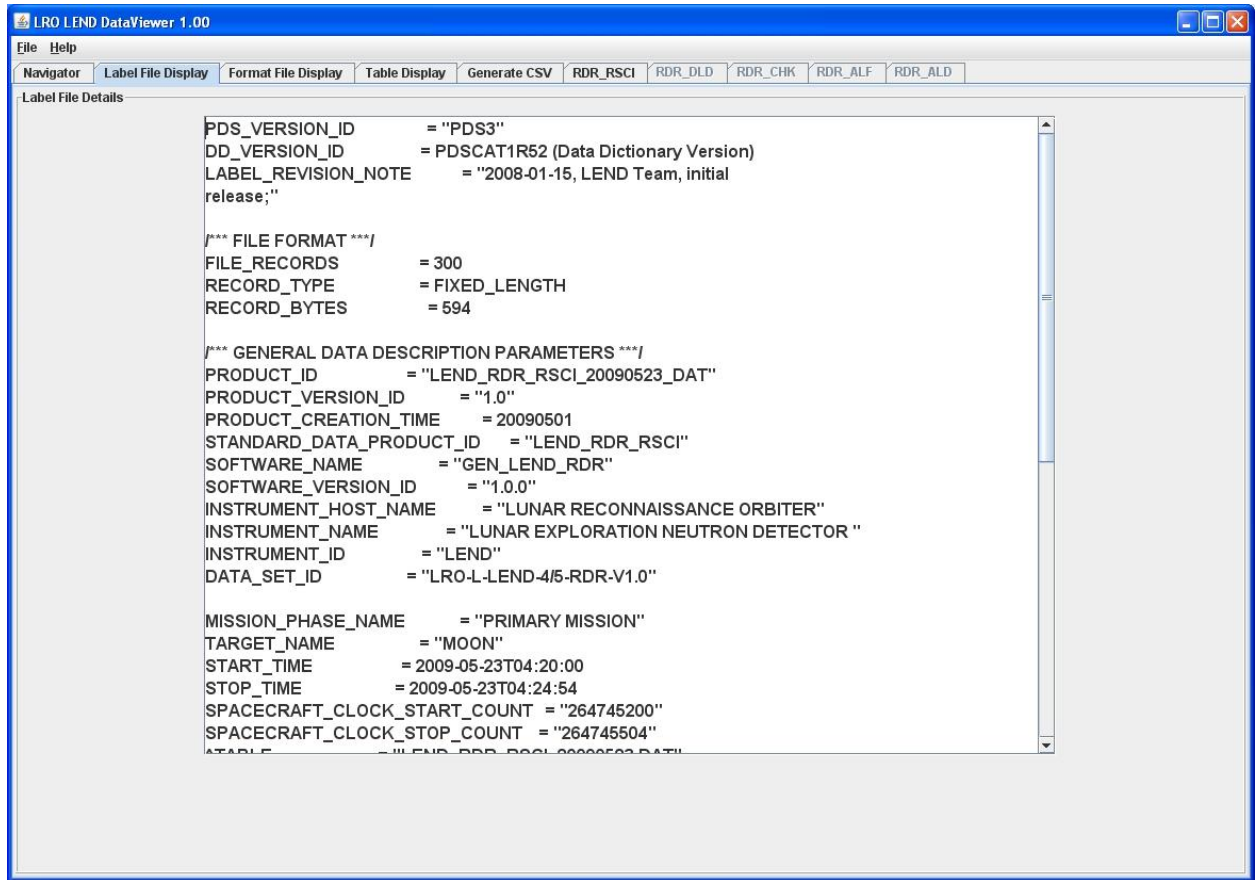


Folders are represented in yellow, dat files in grey, and lbl files in green. Any files represented in red have either incorrect byte length, no matching dat or lbl file, or have an incorrect naming convention as defined by the current SIS document.

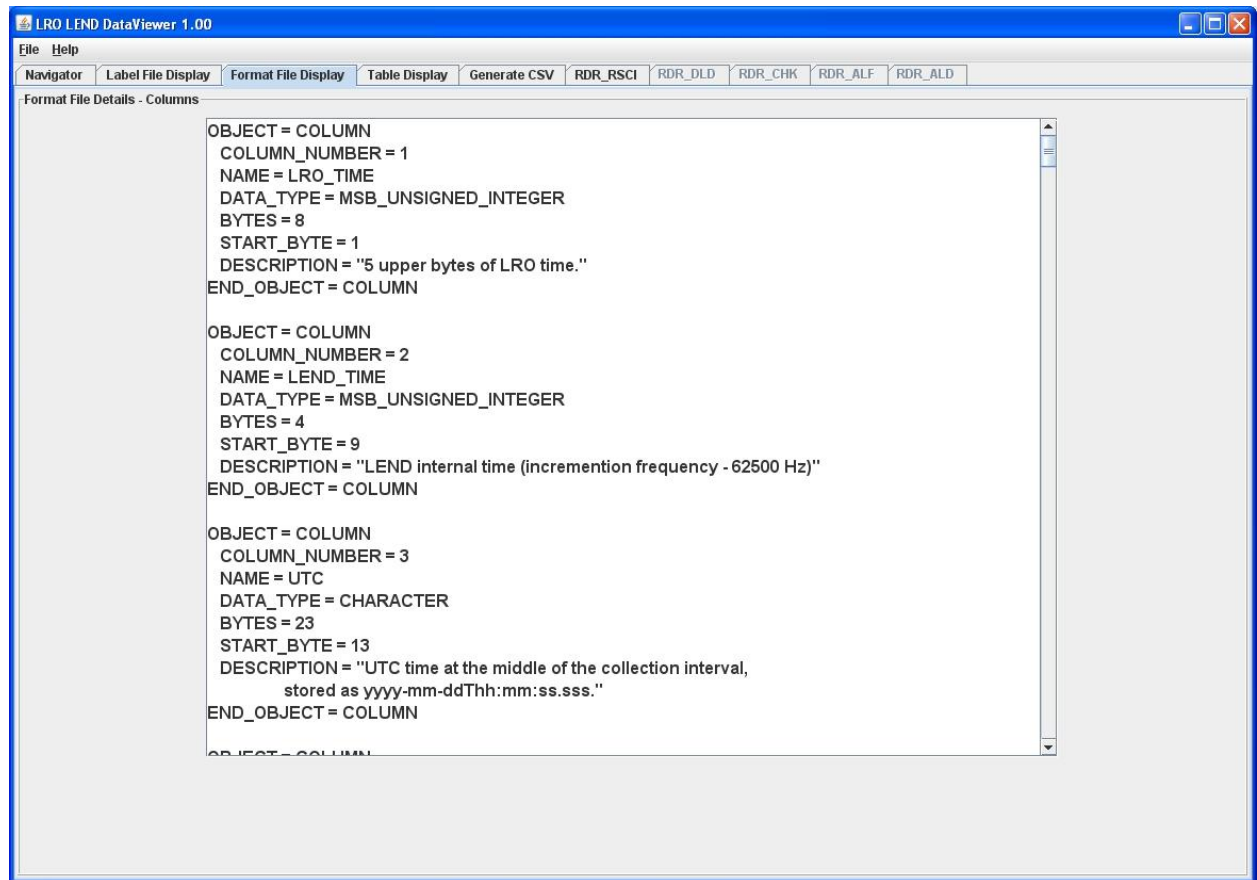
Click once on any lbl file (it will turn blue) and activate the “Update Tabs Using Selection” button, then click on Update Tabs to load the data file(s) associated with the particular label. The progress bar at the bottom will show the progress by the number of records read.



At this point, the data within the LEND_RDR_RSCI_20090523.DAT file is ready for exploration. Clicking on the Label File Display Tab will display the LBL file as follows:



Clicking on the Format File Display Tab will display the corresponding Format File .fmt as follows:



Clicking on the Table Display Tab will display the data in tabular form as follows. Scrollbars are used to scroll up and down records and across the data columns.

Clicking and dragging with the mouse will highlight any number of records you wish to select and Using Ctrl-A, Ctrl-C, tabular record data may be copied into Excel.

LRO LEND DataViewer 1.00

File Help

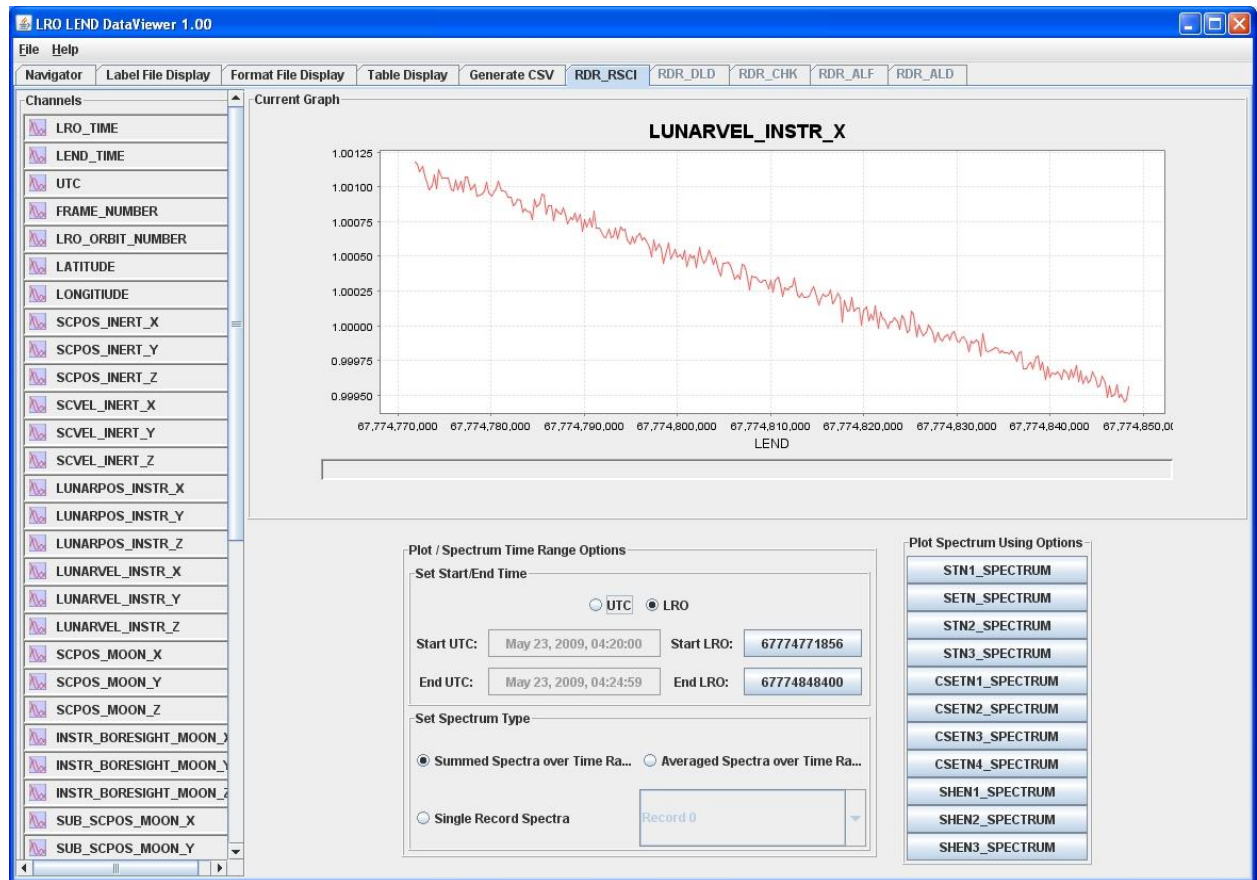
Navigator Label File Display Format File Display Table Display Generate CSV RDR_RSCI RDR_DLD RDR_CHK RDR_ALF RDR_ALD

Current Data Displayed

Data Records Displayed From C:\Documents and Settings\gdroege\Desktop\LendProducts\LEND_RDR_Sample_Products\LEND_RDR_RSCI_20090523

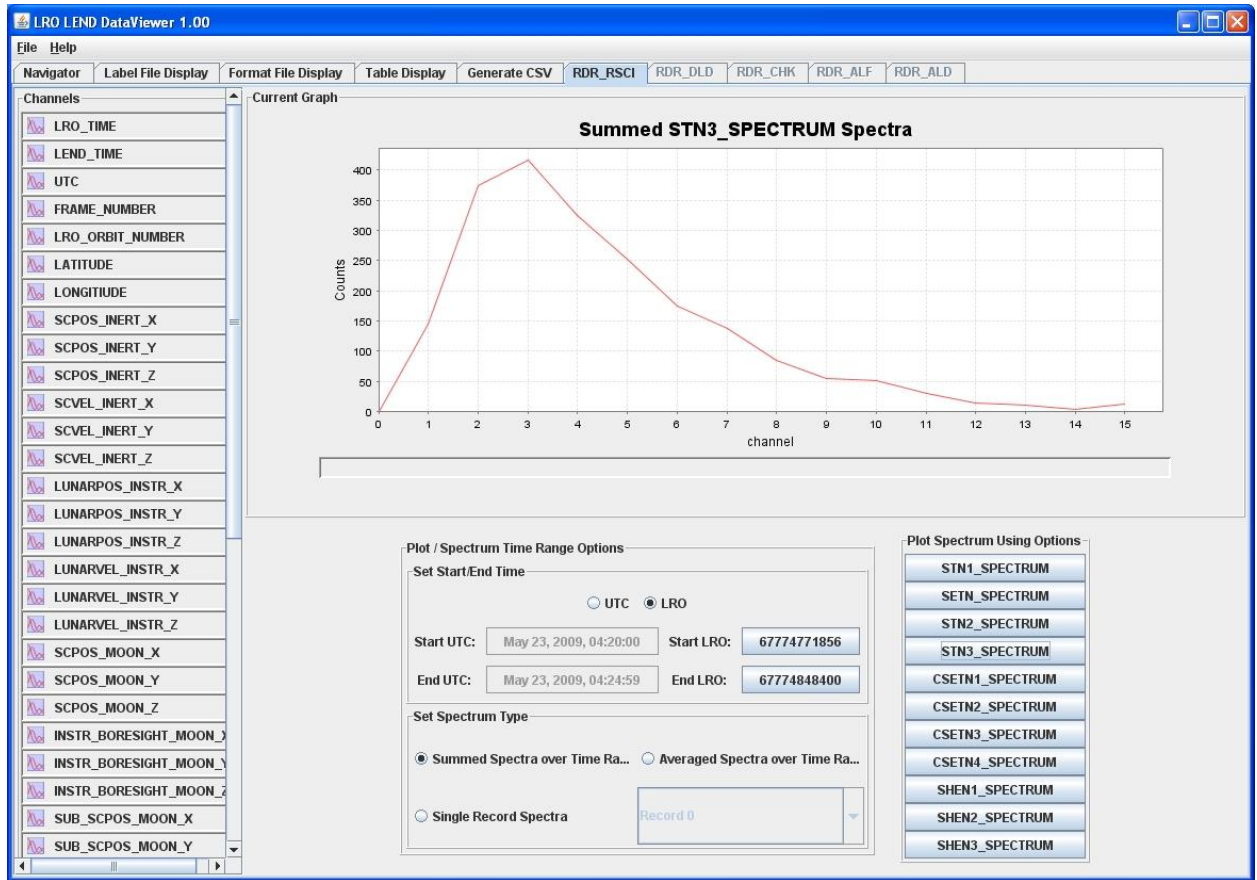
LRO_TIME	LEND_TIME	UTC	FRAME_NUM	LRO_ORBIT	LATITUDE	LONGITUDE	SCPOS_IN_1	SCPOS_IN_2	SCPOS_IN_3	SCVEL_IN_1	SCVEL_IN_2	SCVEL_IN_3	LUNARPOS_1	LUNARPOS_2
677747718...	59592905	2009-05-2...	954	4039	1.1478443...	205.97731...	58190.718...	199500.58...	86457.176...	-0.0071476...	1.0540556...	0.5263213...	-152019.77...	165522.62...
677747721...	59655405	2009-05-2...	955	4039	1.1478590...	205.97723...	58190.711...	199501.63...	86457.702...	-0.0071496...	1.0540486...	0.5263183...	-152018.34...	165525.64...
677747723...	59717905	2009-05-2...	956	4039	1.1478738...	205.97716...	58190.704...	199502.69...	86458.228...	-0.0071515...	1.0540416...	0.5263153...	-152018.63...	165539.92...
677747726...	59780405	2009-05-2...	957	4039	1.1478886...	205.97709...	58190.697...	199503.74...	86458.754...	-0.0071534...	1.0540347...	0.5263123...	-152017.92...	165529.41...
677747728...	59842905	2009-05-2...	958	4039	1.1479034...	205.97702...	58190.690...	199504.80...	86459.281...	-0.0071554...	1.0540277...	0.5263093...	-151999.79...	165547.74...
677747731...	59905405	2009-05-2...	959	4039	1.1479182...	205.97694...	58190.682...	199505.85...	86459.807...	-0.0071573...	1.0540207...	0.5263062...	-151989.70...	165558.79...
677747733...	59967905	2009-05-2...	960	4039	1.1479330...	205.97687...	58190.675...	199506.90...	86460.333...	-0.0071593...	1.0540138...	0.5263032...	-151978.58...	165570.67...
677747736...	60030405	2009-05-2...	961	4039	1.1479477...	205.97680...	58190.668...	199507.96...	86460.860...	-0.0071612...	1.0540068...	0.5263002...	-151968.82...	165564.84...
677747739...	60092905	2009-05-2...	962	4039	1.1479625...	205.97672...	58190.661...	199509.01...	86461.386...	-0.0071632...	1.0539998...	0.5262972...	-152013.66...	165541.74...
677747741...	60155405	2009-05-2...	963	4039	1.1479773...	205.97665...	58190.654...	199510.07...	86461.912...	-0.0071651...	1.0539928...	0.5262942...	-151987.24...	165567.83...
677747744...	60217905	2009-05-2...	964	4039	1.1479921...	205.97658...	58190.647...	199511.12...	86462.439...	-0.0071671...	1.0539859...	0.5262912...	-152027.02...	165532.89...
677747746...	60280405	2009-05-2...	965	4039	1.1480069...	205.97650...	58190.640...	199512.17...	86462.965...	-0.0071690...	1.0539789...	0.5262882...	-152014.25...	165546.32...
677747749...	60342905	2009-05-2...	966	4039	1.1480217...	205.97643...	58190.632...	199513.23...	86463.491...	-0.0071709...	1.0539719...	0.5262852...	-152016.10...	165546.34...
677747751...	60405405	2009-05-2...	967	4039	1.1480365...	205.97636...	58190.625...	199514.28...	86464.017...	-0.0071729...	1.0539650...	0.5262822...	-152019.57...	165544.78...
677747754...	60467905	2009-05-2...	968	4039	1.1480512...	205.97629...	58190.618...	199515.34...	86464.544...	-0.0071748...	1.0539580...	0.5262792...	-152023.81...	165542.48...
677747756...	60530405	2009-05-2...	969	4039	1.1480660...	205.97621...	58190.611...	199516.39...	86465.070...	-0.0071768...	1.0539510...	0.5262762...	-151999.96...	165566.27...
677747759...	60592905	2009-05-2...	970	4039	1.1480808...	205.97614...	58190.604...	199517.44...	86465.596...	-0.0071787...	1.0539440...	0.5262732...	-152001.59...	165566.40...
677747762...	60655405	2009-05-2...	971	4039	1.1480956...	205.97607...	58190.596...	199518.50...	86466.123...	-0.0071807...	1.0539371...	0.5262702...	-152026.45...	165545.20...
677747764...	60717905	2009-05-2...	972	4039	1.1481104...	205.97599...	58190.589...	199519.55...	86466.649...	-0.0071826...	1.0539301...	0.5262672...	-152009.52...	165562.49...
677747767...	60780405	2009-05-2...	973	4039	1.1481252...	205.97592...	58190.582...	199520.61...	86467.175...	-0.0071845...	1.0539231...	0.5262642...	-152027.97...	165547.22...
677747769...	60842905	2009-05-2...	974	4039	1.1481399...	205.97585...	58190.575...	199521.66...	86467.701...	-0.0071865...	1.0539162...	0.5262611...	-152009.23...	165566.16...
677747772...	60905405	2009-05-2...	975	4039	1.1481547...	205.97577...	58190.568...	199522.71...	86468.228...	-0.0071884...	1.0539092...	0.5262581...	-152044.23...	165535.60...
677747774...	60967905	2009-05-2...	976	4039	1.1481695...	205.97570...	58190.561...	199523.77...	86468.754...	-0.0071904...	1.0539022...	0.5262551...	-152044.31...	165537.26...
677747777...	61030404	2009-05-2...	977	4039	1.1481843...	205.97563...	58190.553...	199524.82...	86469.280...	-0.0071923...	1.0538953...	0.5262521...	-152020.55...	165560.87...
677747780...	61092904	2009-05-2...	978	4039	1.1481991...	205.97555...	58190.546...	199525.88...	86469.806...	-0.0071943...	1.0538883...	0.5262491...	-152027.96...	165555.68...
677747782...	61155404	2009-05-2...	979	4039	1.1482138...	205.97548...	58190.539...	199526.93...	86470.333...	-0.0071962...	1.0538813...	0.5262461...	-152040.72...	165545.51...
677747785...	61217904	2009-05-2...	980	4039	1.1482286...	205.97541...	58190.532...	199527.98...	86470.859...	-0.0071982...	1.0538743...	0.5262431...	-152015.90...	165570.17...
677747787...	61280404	2009-05-2...	981	4039	1.1482434...	205.97534...	58190.525...	199529.04...	86471.385...	-0.0072001...	1.0538674...	0.5262401...	-152021.92...	165566.29...
677747790...	61342904	2009-05-2...	982	4039	1.1482582...	205.97526...	58190.517...	199530.09...	86471.911...	-0.0072020...	1.0538604...	0.5262371...	-152025.80...	165564.44...
677747792...	61405404	2009-05-2...	983	4039	1.1482730...	205.97519...	58190.510...	199531.15...	86472.438...	-0.0072040...	1.0538534...	0.5262341...	-152032.30...	165560.20...
677747795...	61467904	2009-05-2...	984	4039	1.1482878...	205.97512...	58190.503...	199532.20...	86472.964...	-0.0072059...	1.0538465...	0.5262311...	-152052.88...	165542.90...
677747797...	61530404	2009-05-2...	985	4039	1.1483025...	205.97504...	58190.496...	199533.25...	86473.490...	-0.0072079...	1.0538395...	0.5262281...	-152035.72...	165560.33...
677747800...	61592904	2009-05-2...	986	4039	1.1483173...	205.97497...	58190.489...	199534.31...	86474.016...	-0.0072098...	1.0538325...	0.5262251...	-152034.25...	165563.36...
677747803...	61655404	2009-05-2...	987	4039	1.1483321...	205.97490...	58190.481...	199535.36...	86474.542...	-0.0072118...	1.0538256...	0.5262221...	-152043.54...	165556.55...
677747805...	61717904	2009-05-2...	988	4039	1.1483469...	205.97482...	58190.474...	199536.41...	86475.069...	-0.0072137...	1.0538186...	0.5262191...	-152053.92...	165548.69...
677747808...	61780404	2009-05-2...	989	4039	1.1483617...	205.97475...	58190.467...	199537.47...	86475.595...	-0.0072156...	1.0538116...	0.5262161...	-152069.53...	165535.97...
677747810...	61842904	2009-05-2...	990	4039	1.1483764...	205.97468...	58190.460...	199538.52...	86476.121...	-0.0072176...	1.0538046...	0.5262131...	-152052.95...	165553.01...
677747813...	61905404	2009-05-2...	991	4039	1.1483912...	205.97461...	58190.452...	199539.58...	86476.647...	-0.0072195...	1.0537977...	0.5262100...	-152054.62...	165553.15...
677747815...	61967904	2009-05-2...	992	4039	1.1484060...	205.97453...	58190.445...	199540.63...	86477.174...	-0.0072215...	1.0537907...	0.5262070...	-152056.97...	165552.61...
677747818...	62030404	2009-05-2...	993	4039	1.1484208...	205.97446...	58190.438...	199541.68...	86477.700...	-0.0072234...	1.0537837...	0.5262040...	-152049.11...	165561.52...
677747820...	62092904	2009-05-2...	994	4039	1.1484356...	205.97439...	58190.431...	199542.74...	86478.226...	-0.0072254...	1.0537767...	0.5262010...	-152061.30...	165561.34...

Depending on what type of data is loaded from the Navigator panel, a graphing tab specific to the data type will enable allow graphical representation of the data. In the example here, we loaded a RDR_RSCI (Rectified Science data) file. Clicking therefore on the RDR_RSCI tab allows graphical displays of the data and spectra as follows:



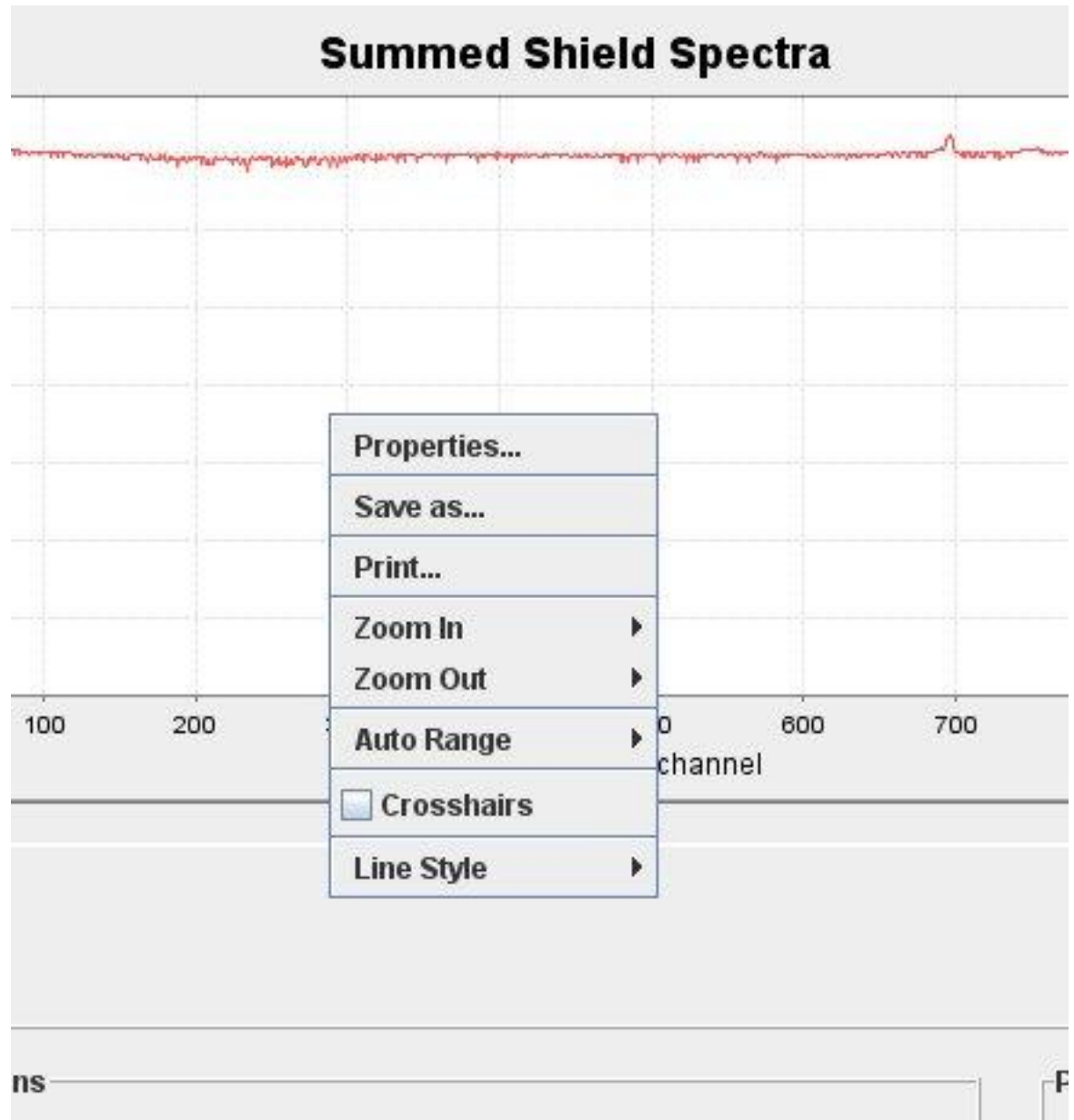
Each of the data channels may be displayed in either LRO or UTC time. The Start and End Times may be adjusted to view a smaller section of the data.

Spectra may be plotted by choosing the spectra type (single, summed, or averaged) and clicking on the button to plot the spectra.



b) Graphing Options

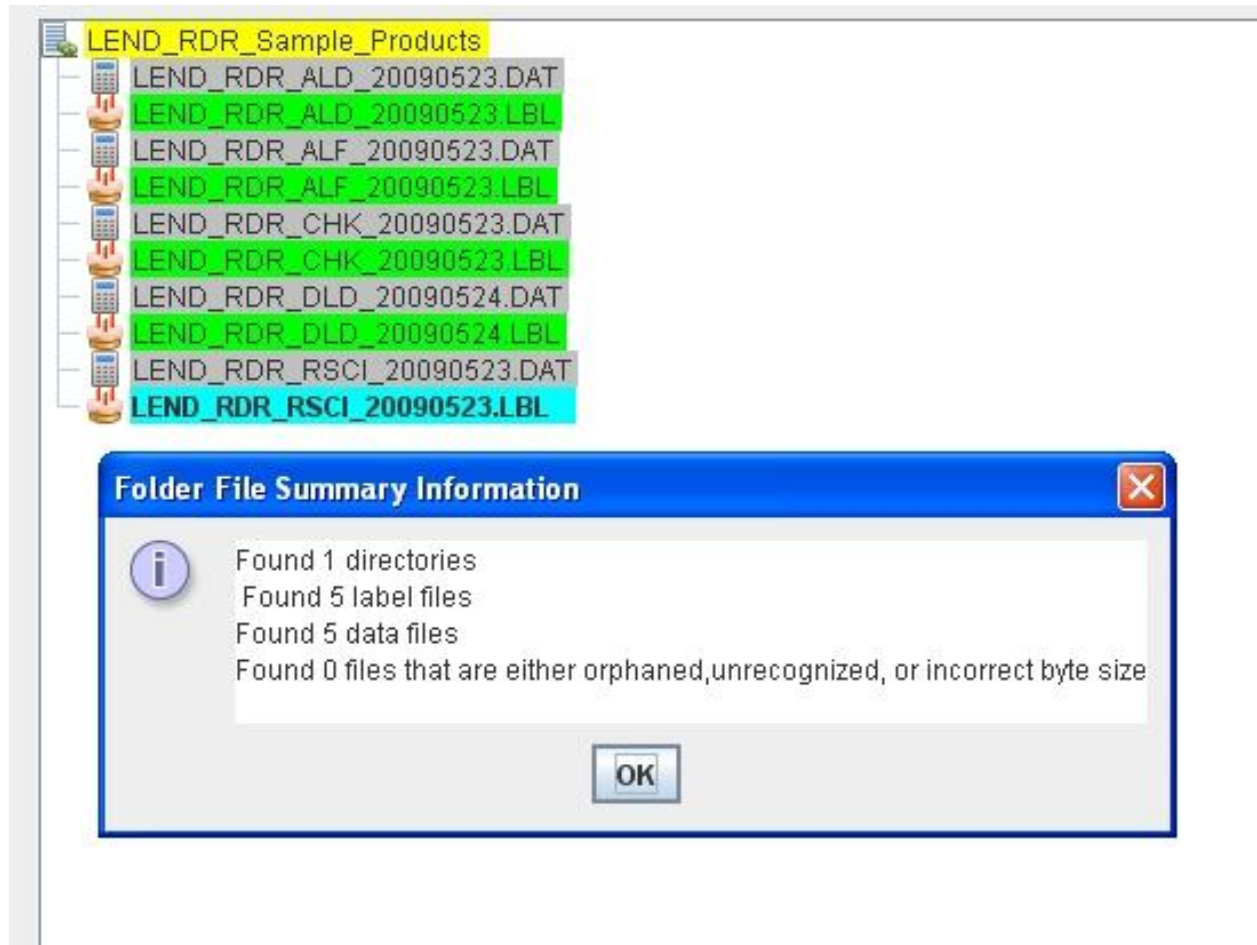
Right clicking on a graph will bring up the graphing options window as follows:



A graph may be zoomed in also clicking / dragging a selection with the mouse and zoomed out by clicking / dragging leftward with the mouse.

c) Displaying File or Summary Info

Clicking on Check File Info will display the information on the current highlighted (blue) file.

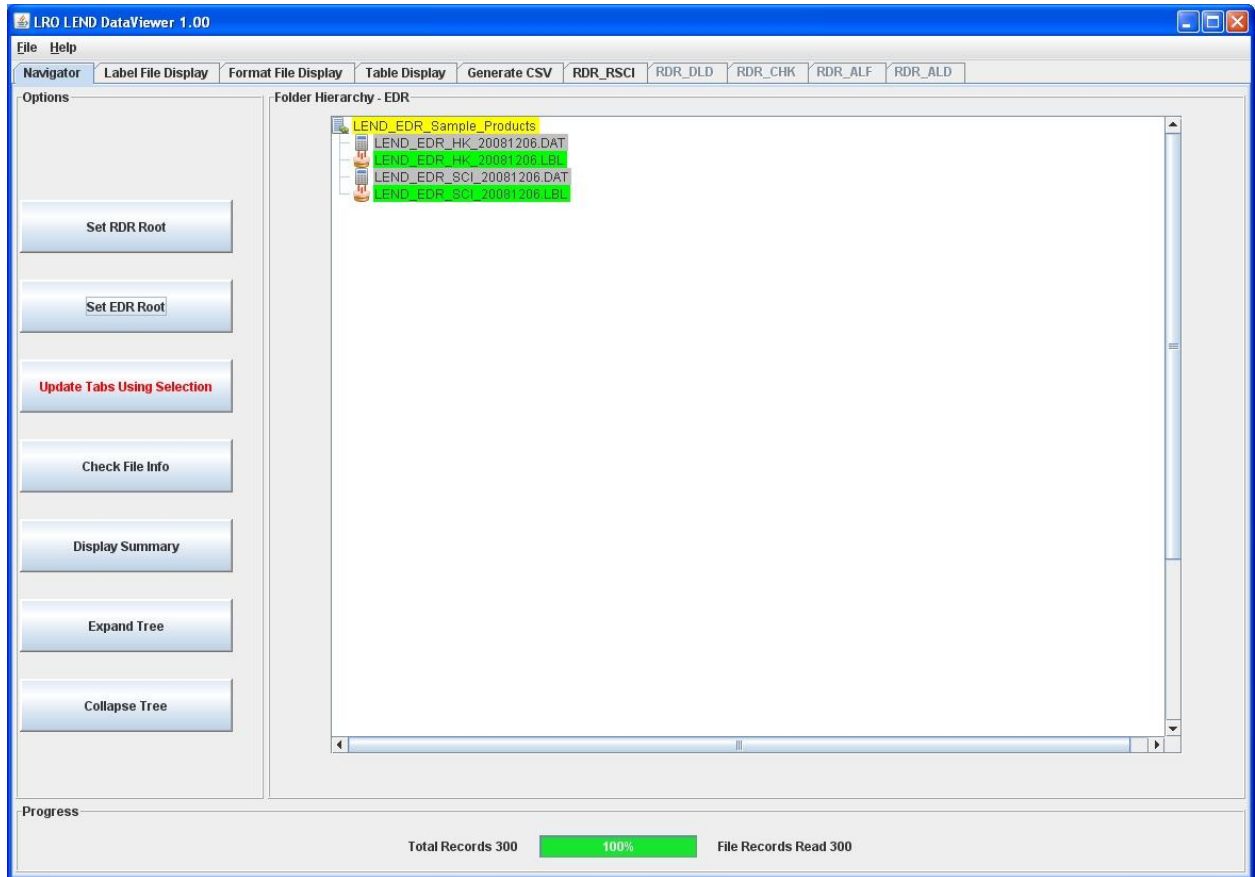


d) Expanding or Collapsing Tree Hierarchy

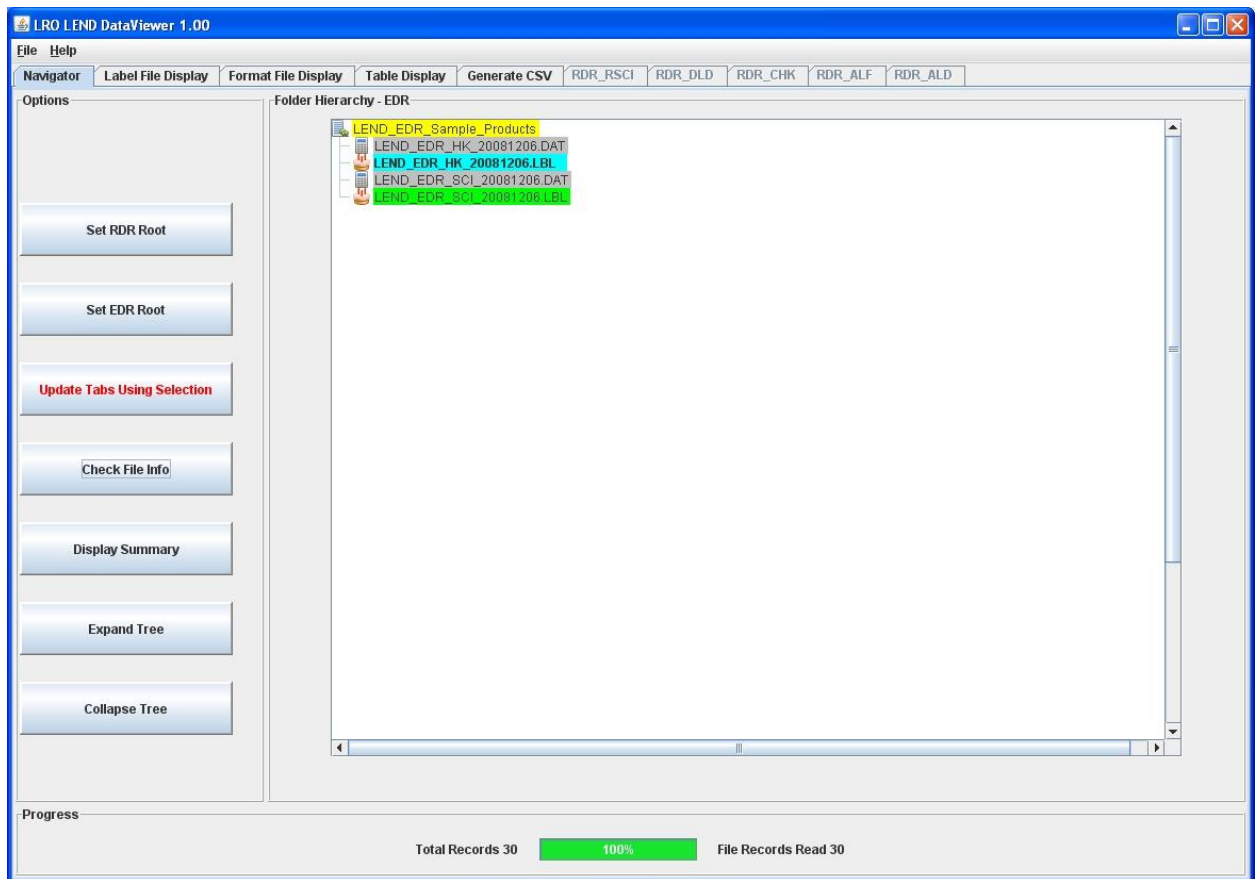
Clicking on expand tree / collapse tree, expands or collapses the tree hierarchy view in the navigator window.

6) Displaying EDR Files

To begin, open an EDR archive by clicking on the “Set EDR Root button” Navigate to the top level folder that contains all of your EDR files and click on “Open” Your PDS files will be checked for correct byte length, and also that each dat file has a corresponding lbl file. A Tree structure will be displayed representing your PDS EDR files, as follows:

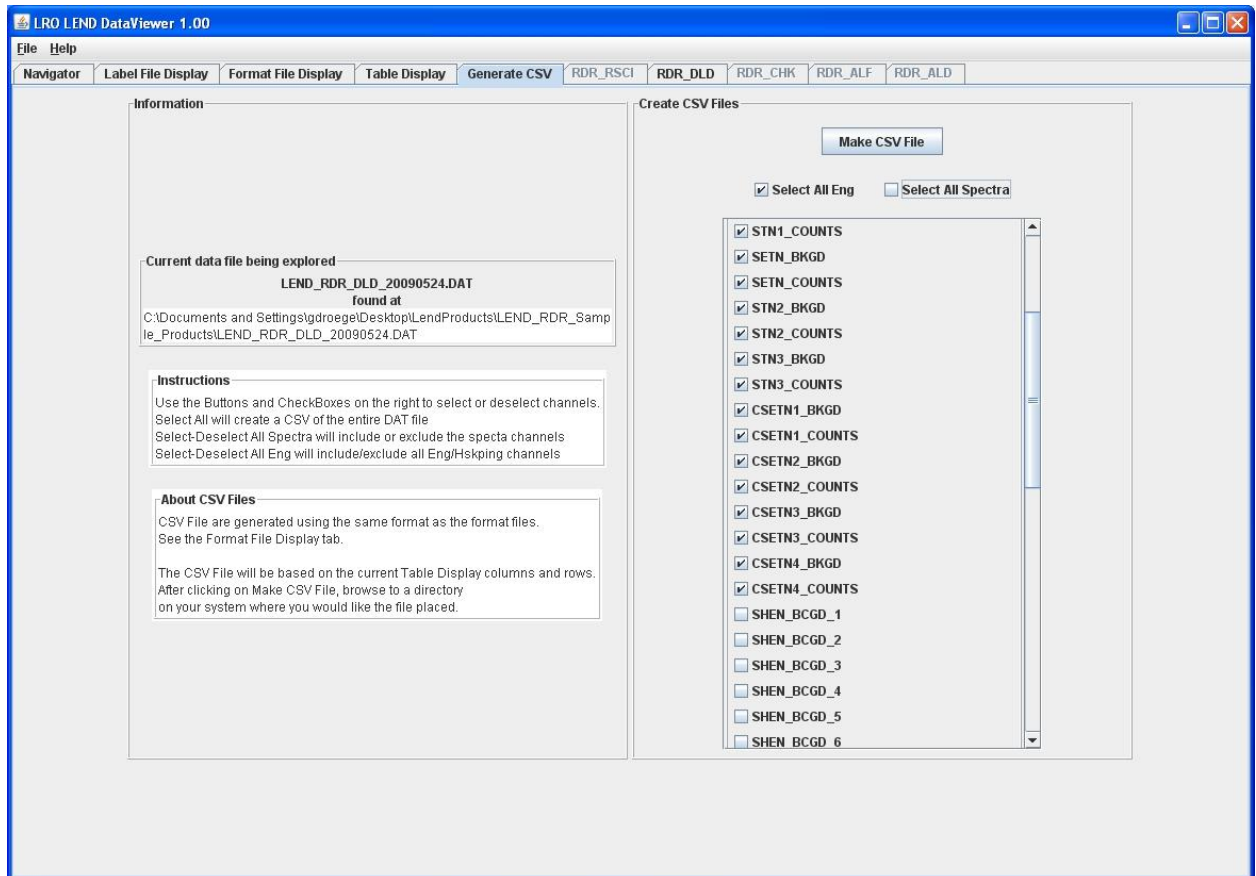


Then just like with the CDR files, click on any lbl file and hit Update Tabs Using Selection to load the corresponding data file.



As above, this activates the label, format and table displays for the EDR data file. There is no support currently for graphical display of EDR data files.

7) Generating CSV Files



A tab called “Generate CSV” allows you to generate a csv file from the current .dat file being explored. Click on Make CSV File and browse to a directory to save the file generated. You may give the file a name or use the default csv name. The csv format will match the format file for the data type being written. A warning will be displayed if you are about to overwrite a file with the same name or if the file is currently opened.